

Internal space walk restores Spektr power connections

By Ed Campion

A first of its kind internal space walk inside the Russian Mir Space Station apparently restored power connections between the three functioning solar arrays located on the damaged Spektr science module and the rest of the orbiting Russian facility.

The intervehicular activity or IVA, was conducted by Mir 24 Commander Anatoly Solovyev and Flight Engineer Pavel Vinogradov last Friday. In addition to reestablishing the link to Spektr's solar arrays, the two cosmonauts made a brief inspection of the inside of the module to see if they could identify the source of the leak that caused the decompression of Spektr after an unmanned Progress vehicle struck the station on June 25. They also retrieved science data material along with personal items belonging to their fellow Mir crew mate, NASA Astronaut Mike Foale.

The journey into the Spektr module was the first of what Russian space officials plan to be

a series of space walks to try and recover as much capability of the science module as possible. The second space walk in the series is targeted for around Sept. 3 or 4 and will have Solovyev and either Vinogradov or Foale make a trip outside the station to make a visual inspection of the Spektr and to connect work handrails for future space walking activities. Foale was given the green light to begin on-orbit training recently and U.S. and Russian space managers will meet soon to give final approval for his possible participation.

The first part of their three and a half hours spent inside the Spektr module saw Solovyev and Vinogradov connect 11 cables to the specially modified hermaplate area on a new Spektr hatch cover. Eight of the cables are for power generated by the solar arrays, one is for attitude control system on the arrays and two are

spares for future use.

How much additional power will be available from the Spektr arrays is yet to be determined. The cosmonauts and Russian flight controllers will need to evaluate how efficiently the solar arrays are operating along with the arrays' ability to track the sun before being able to determine the exact increase in power generation capability. For right now, the Russians have told NASA managers to use an extremely conservative estimate of 30 percent additional power in their planning efforts for future science operations.

Following completion of the cable connection objective, the cosmonauts then performed a visual inspection of the inside of Spektr. As part of the inspection, they removed two panels along the interior side wall to check for any leak sources. While the cosmonauts reported they could not see

any obvious signs of a tear or puncture, their search was recorded on video, which is scheduled to be downlinked to Russian flight controllers for analysis.

The final portion of the internal space walk saw the two cosmonauts retrieve science data material along with some personal items belong to Foale. The science material and personal items retrieved were located near the hatchway where the cosmonauts were working. Equipment and belongings located deeper inside the module towards the rear of the compartment were not recoverable.

Foale is in the 15th week of his tour of duty on Mir. He will be replaced in September by astronaut David Wolf, who is nearing completion of his training at the Gagarin Cosmonaut Training Center outside Moscow. Wolf will be launched to the Mir aboard *Atlantis* on the STS-86 mission, which will dock to the Mir for the seventh time to bring Foale home and to deliver water and logistical supplies to the station.



Atlantis rolls to pad for STS-86

By Kyle Herring

On Aug. 18, while Mission Control was deciding whether the weather would bring an end to the STS-85 mission of *Discovery*, technicians at the Florida spaceport transported *Atlantis* to its seaside launch pad for its seventh voyage to the Russian Mir Space Station.

Shuttle managers tentatively have chosen 9:34 p.m. CDT Sept. 25 for launch of STS-86 to rendezvous and dock with Mir. *Atlantis* will bring supplies and equipment, along with



Astronaut Dave Wolf, in support of the continuous U.S. presence on Mir leading toward the next step in the International Space Station that begins in the summer of next year.

The crew for this 87th shuttle flight includes Commander Jim Wetherbee, Pilot Mike Bloomfield, Mission Specialists Scott Parazynski, Wendy Lawrence, Jean-Loup Chretien and Vladimir Titov. Wolf will replace Mike Foale who's been on Mir since May.

The international crew consists of a French astronaut, Chretien, and a Russian cosmonaut, Titov. The two have lived aboard Mir previously and Wetherbee has seen the station closeup on the first Phase I mission back in February 1995.

Titov and Parazynski will conduct a space walk on the fourth docked day to retrieve four suitcase-sized experiments that were attached to the Mir's docking module by Linda Godwin and Rich Clifford during STS-76 to characterize the environment surrounding Mir. The space walk by Titov will be the first by a foreign astronaut on the shuttle.

SPACE STATION INSPECTION — Astronauts and Boeing engineers and workers from Huntsville, Ala., take part in the Node 1 Main System Verification in the Space Station Processing Facility at Kennedy Space Center. The verification tests on-orbit maintenance items and inner vehicular activity hardware. Kneeling from left are Susan Helms, Manufacturing Engineer Harry Feinberg of Boeing, and Astronauts Carl Walz and Ken Bowersox. Standing from left are Stacy George of Boeing and Ted Kenny of Barrios Technology who supports Mission Operations at JSC. Node 1, serve as a passageway to the laboratory and habitation modules and an airlock.



From left, JSC Acting Assistant Director, Technical Charlie Precourt and JSC Director George Abbey welcome home STS-85 Pilot Kent Rominger and his family. Brown and the other five members of the STS-85 crew returned home to Ellington Field last week after a 12-day mission that focused on science, technology and engineering development for the International Space Station.

JSC employees must report mishaps in foreign countries

JSC employees who do business in foreign countries are required to report mishaps that may occur while traveling.

Employee are required to report any job-related injury or occupational illness, damage to JSC equipment and job-related close calls where JSC personnel could have been injured or JSC equipment could have been damaged.

If a mishap occurs, employees must follow the reporting process in Chapter 106 of JSC Procedures and Guidelines (JPG) 1700.1G, "JSC Requirements Document for Safety,

Health, and Environmental Protection," as closely as the situation will allow.

To report the mishap, call the JSC Occupational Safety Office at x34290, during normal JSC operational hours or the JSC Emergency Operations Center, telephone number x34658, after hours. If a mishap involves death, serious injury, or property damage over \$250,000, employees are required to report via telephone within eight hours.

Employees who need more information may call x34290.



STS-85 mission allows practice for station work

(Continued from Page 1)

Brown and Pilot Kent Rominger flew a precise rendezvous to the satellite as future missions will to the International Space Station. The velocity bar, or "V-Bar," approach is part of an evaluation of the proximity operations profile to be used during assembly to ensure thruster firings do not impinge the station.

Rominger praised the team on the ground for not only getting *Discovery* into orbit, but also for a well-thought out plan that the crew could execute.

"It was an extremely payload intensive flight. Before launch you plan out and choreograph this great timeline, but you learn in the research game that once you get up there things change," he told the Ellington crowd. "Once we got up there and experiments started behaving differently than expected, there was a lot of work to be done on the ground. Plans had to be integrated to figure out a sophisticated plan that could be executed. My hat's off to the group in Mission Control that put this plan together and got it up to us so we could maximize the science," Rominger said.

Mission Specialist Bob Curbeam, following his first flight, called the view from space one that would "make a conservationist out of you." He told the well-wishers at the crew return ceremony last Tuesday that he "saw more of Earth in one orbit than I have ever seen in my life." Curbeam said that during the mission, "We looked at the solar system, we looked at stars, but I think what we learned the most about was this Earth. When you see it for the first time from orbit, it is absolutely beautiful. It is awe inspiring."

Also directly related to future space station operations, a prototype robotic arm that will ultimately find its way the exposed facility of the Japanese Experiment Module, was tested extensively throughout the flight—not only by Davis and fellow Mission Specialist Steve Robinson aboard *Discovery*, but also remotely by ground operators in Mission Control. The Manipulator Flight Demonstration Small Fine Arm was put through a series of tests just about every other day during the mission to verify the arm's ability to manipulate a simulated orbital replacement unit and a small door located on the arm's fixed support structure in the payload bay.

Robinson, a first time shuttle flyer, spoke of the teamwork needed to get the job done—both in space and on the ground.

"When we were deploying SPAS with the arm or working the MFD, we were seeing your faces and hearing your words and trying to do the right thing," he said to coworkers at the crew return. "You took us to orbit, but we brought you with us."

Throughout the mission, Canadian Payload Specialist Bjarni Tryggvason tested a device very close to his heart, since he is also the principal investigator. The Microgravity Vibration Isolation Mount garnered valuable data on the role that vibrations have on different experiment processes in the microgravity environment of space. The information obtained during the experiment's first flight will be used to design experiments for the station requiring motion-isolation systems. A less advanced version is currently flying aboard Mir.

Tryggvason devoted most of the mission to the MIM experiment, but gave much of the credit for its operations to the ground support team.

"I had my little MIM gang here in Houston supporting this experiment," he said at Ellington. "While I worked hard doing my part, they really worked hard staying abreast of where I was and they turned around data that I sent down every day and sent back up new things to try. We couldn't do this without the support of these folks."

Two space station experiments that complimented robotic arm activities included the Space Vision System, developed in Canada and the AutoTRAC Computer Vision System designed at JSC. Both used existing payload bay cameras and other payload bay hardware providing precise relative position, attitude, and rate cues in a concise graphical and digital format.